

WHAT IS CLAIMED IS:

1. A method for managing color data to transform source color image data from a source device into destination color image data for rendering by a destination device, said method comprising the steps of:

accessing a source color data file corresponding to the source device, the source color data file containing source device color characteristic data;

constructing a source color transform based on the source device color characteristic data contained in the source color data file; and

applying the source color transform to the source color image data to transform the source color image data from a source device color space into interim color image data in an interim color space.

2. A method for managing color data according to Claim 1, wherein the source device color characteristic data contains measured colorimetric data and corresponding device signal data.

3. A method for managing color data according to Claim 1, wherein the color data file further contains viewing condition data corresponding to a set of viewing conditions in which the source device color characteristic data was measured.

4. A method for managing color data according to Claim 3, wherein the viewing condition data includes ambient colorimetric specification data.

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5. A method for managing color data according to Claim 3, wherein the viewing condition data includes surround colorimetric specification data.

6. A method for managing color data according to Claim 3, wherein the viewing condition data includes background colorimetric specification data.

7. A method for managing color data according to Claim 3, wherein the viewing condition data includes adapting field colorimetric specification data.

8. A method for managing color data according to Claim 2, wherein the device signal data represents a set of input command signal values for the source device.

9. A method for managing color data according to Claim 2, wherein the measured colorimetric data represents a set of measured color values corresponding to a rendered color image.

10. A method for managing color data according to Claim 2, wherein the device signal data represents a set of output command signal values from the source device.

11. A method for managing color data according to Claim 2, wherein the measured colorimetric data represents a set of measured color values corresponding to a color image rendered by the source device.

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12. A method for managing color data according to Claim 2, wherein the source device is a printer, wherein the device signal data represents a set of input command signal values for the printer, and wherein the measured colorimetric data represents a set of measured color values corresponding to a color image rendered by the printer.

13. A method for managing color data according to Claim 2, wherein the source device is a scanner, wherein the measured colorimetric data represents a set of measured color values corresponding to a rendered color image, and wherein the device signal data represents a set of output signal values from the scanner.

14. A method for managing color data according to Claim 1, further comprising the step of transforming the interim color image data into destination color image data in a destination device color space.

15. A method for managing color data according to Claim 1, further comprising the step of incorporating the source color transform in a color transformation sequence.

16. A method for managing color data according to Claim 15, further comprising the step of applying the color transformation sequence to the source color image data to generate destination color image data in a destination device color space.

17. A method for managing color data according to Claim 14, wherein the step of

transforming the interim color image data into destination color image data includes accessing a destination color data file which contains destination device color characteristic data, and constructing a destination color transform based on the destination device color characteristic data, the destination color transform for transforming a set of color data from the interim color space to the destination device color space.

18. A method for managing color data according to Claim 14, wherein the step of transforming the interim color image data into destination color image data includes accessing and utilizing a destination device color profile containing a destination color transform, the destination color transform for transforming a set of color data from the interim color space to the destination device color space.

19. A method for managing color data according to Claim 1, wherein the interim color space is a device-independent color space.

20. A method for managing color data according to Claim 19, wherein the device-independent color space is a CIE LAB color space.

21. A method for managing color data according to Claim 19, wherein the device-independent color space is a color space composed of a lightness component, and two orthogonal color components for defining a chroma value and a hue value.

22. A method for managing color data according to Claim 19, wherein the device-

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independent color space is a profile connection space.

23. A method for managing color data according to Claim 1, wherein the source device color characteristic data represents spectral measurement values corresponding to the source device.

24. A method for managing color data according to Claim 23, wherein the source color data file also contains viewing condition data representing a set of desired viewing conditions.

25. A method for managing color data according to Claim 24, wherein the construction of the source color transform is also based on the viewing condition data.

26. A method for managing color data according to Claim 23, wherein the construction of the source color transform is also based on a set of desired viewing condition data.

27. A method for managing color data according to Claim 1, wherein the construction of the source color transform utilizes a color appearance model.

28. A method for managing color data according to Claim 27, wherein the source color transform is a look-up table.

29. A method for managing color data according to Claim 27, wherein the source color transform is a polynomial function.

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30. A method for managing color data according to Claim 27, wherein the source color transform is a single-variate transform.

31. A method for managing color data according to Claim 27, wherein the source color transform is a multi-variate transform.

32. A method for managing color data according to Claim 1, wherein the construction of the source color transform includes optimizing the source color transform for efficient application to a set of color image data.

33. A method for managing color data according to Claim 1, wherein the construction of the source color transform is optimized to increase accuracy of a transformation of the source color image data.

34. A method for managing color data according to Claim 33, wherein the construction of the source color transform is optimized to create a preferred reproduction of the source color image data.

35. A method for managing color data according to Claim 1, wherein the source color data file is formatted according to a predetermined standardized format.

36. A method for managing color data according to Claim 35, wherein the source color data file includes a set of tags for the source device color characteristic data.

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37. A method for managing color data according to Claim 35, wherein the source color data file includes a set of tags for a set of viewing condition data corresponding to a set of viewing conditions in which the source device color characteristic data was measured.

38. A method for managing color data according to Claim 35, wherein the predetermined standardized format is an extended CGATS/IT8 format.

39. A method for managing color data according to Claim 38, wherein the extended CGATS/IT8 format includes a set of tags for the source device color characteristic data.

40. A method for managing color data according to Claim 38, wherein the extended CGATS/IT8 format includes a set of tags for a set of viewing condition data corresponding to a set of viewing conditions in which the source device color characteristic data was measured.

41. A method for managing color data according to Claim 9, wherein the measured colorimetric data is in a standard color space.

42. A method for managing color data according to Claim 41, wherein the standard color space is an XYZ color space.

43. A method for managing color data according to Claim 11, wherein the measured colorimetric data is in a standard color space.

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44. A method for managing color data according to Claim 43, wherein the standard color space is an XYZ color space.

45. A method for managing color data according to Claim 1, wherein the construction of the source color transform is based on a type of the interim color space and a color appearance model.

46. A method for managing color data according to Claim 3, wherein the construction of the source color transform is based on the viewing condition data.

47. A method for managing color data according to Claim 1, wherein the source color transform is stored in a memory.

48. A method for managing color data according to Claim 1, wherein the source color transform is stored in a device color profile.

49. A method for managing color data according to Claim 1, wherein a source gamut boundary description is generated from the source color data file.

50. A method for managing color data according to Claim 49, wherein the source gamut boundary description is used in conjunction with a destination gamut boundary description and a gamut mapping algorithm to create a gamut transformation.

51. A method for managing color data to transform source color image data from a source device into destination color image data for

rendering by a destination device, said method comprising the steps of:

accessing a source color data file corresponding to the source device, the source color data file being formatted according to a standard predetermined format and having a plurality of tags containing source device color characteristic data and a set of viewing condition data corresponding to a set of viewing conditions in which the source device color characteristic data was measured;

constructing a source color transform based on the source device color characteristic data and the set of viewing condition data by utilizing an interim color space and a color appearance model, the source color transform for transforming the source color image data from a source device color space into an interim color space;

incorporating the source color transform in a color transformation sequence; and

applying the color transformation sequence to the source color image data to transform the source color image data from the source device color space into a destination device color space.

52. A memory for access by a color management system, the color management system for transforming source color image data from a source device into destination color image data for rendering by a destination device, said memory comprising:

a colorimetric data structure stored in the memory, the colorimetric data structure being formatted according to a predetermined format and containing a set of device color characteristic data elements representing a set of color characteristics of a color device and a set of viewing condition

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data elements representing a set of viewing conditions of a color device.

53. A memory according to Claim 52, wherein the set of device color characteristic data elements includes measured colorimetric data elements and corresponding device signal data elements.

54. A memory according to Claim 52, wherein the viewing condition data elements represent a set of viewing conditions in which the device color characteristic data elements were measured.

55. A memory according to Claim 54, wherein the viewing condition data elements include an ambient colorimetric specification data element.

56. A memory according to Claim 54, wherein the viewing condition data elements include a surround colorimetric specification data element.

57. A memory according to Claim 54, wherein the viewing condition data elements include a background colorimetric specification data element.

58. A memory according to Claim 54, wherein the viewing condition data elements include an adapting field colorimetric specification data element.

59. A memory according to Claim 53, wherein the device signal data elements represent a set of input command signal values for the source device.

60. A memory according to Claim 53, wherein the measured colorimetric data elements represent a set of measured color values corresponding to a rendered color image.

61. A memory according to Claim 53, wherein the device signal data elements represent a set of output command signal values from the source device.

62. A memory according to Claim 53, wherein the measured colorimetric data elements represent a set of measured color values corresponding to a color image rendered by the source device.

63. A memory according to Claim 53, wherein the source device is a printer, wherein the device signal data elements represent a set of input command signal values for the printer, and wherein the measured colorimetric data elements represent a set of measured color values corresponding to a color image rendered by the printer.

64. A memory according to Claim 53, wherein the source device is a scanner, wherein the measured colorimetric data elements represent a set of measured color values corresponding to a rendered color image, and wherein the device signal data elements represent a set of output signal values from the scanner.

65. A memory according to Claim 52, wherein the device color characteristic data elements contains spectral measurement data elements which represent spectral measurement values corresponding to the source device.

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66. A memory according to Claim 65, wherein the colorimetric data structure further includes a set of desired viewing condition data elements representing a set of desired viewing conditions in which a color image is to be viewed.

67. A memory according to Claim 52, wherein the colorimetric data structure is formatted according to a predetermined standardized format.

68. A memory according to Claim 67, wherein the colorimetric data structure includes a set of tags for the device color characteristic data elements.

69. A memory according to Claim 67, wherein the colorimetric data structure includes a set of tags for a set of viewing condition data elements corresponding to a set of viewing conditions in which the device color characteristic data elements were measured.

70. A memory according to Claim 67, wherein the predetermined standardized format is an extended CGATS/IT8 format.

71. A memory according to Claim 70, wherein the extended CGATS/IT8 format includes a set of tags for the device color characteristic data elements.

72. A memory according to Claim 70, wherein the extended CGATS/IT8 format includes a set of tags for a set of viewing condition data elements corresponding to a set of viewing conditions in which the device color characteristic data elements were measured.

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73. A memory according to Claim 53, wherein the measured colorimetric data elements are in a standard color space.

74. A memory according to Claim 73, wherein the standard color space is an XYZ color space.

75. A memory according to Claim 53, wherein the device signal data elements are in a standard color space.

76. A memory according to Claim 75, wherein the standard color space is an XYZ color space.

77. A memory according to Claim 52, wherein the memory is maintained in a computer-readable medium.

78. A memory according to Claim 77, wherein the computer-readable medium is a floppy disk.

79. A memory according to Claim 77,  
wherein the computer-readable medium is a hard disk.

80. A memory according to Claim 77,  
wherein the computer-readable medium is a CD-ROM.

81. A memory according to Claim 52,  
wherein the memory is accessible via a networked  
computing environment.

82. A memory according to Claim 81,  
wherein the networked computing environment is a  
global networked computing environment.

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83. A memory according to Claim 82, wherein the global networked computing environment is the internet.

84. A memory according to Claim 82, wherein the global networked computing environment is the world wide web.

85. A memory according to Claim 52, wherein the memory is disposed within a second memory which contains a set of color image data.

86. A memory according to Claim 85, wherein the second memory further contains a header having a tag corresponding to the colorimetric data structure.

87. A memory for access by a color management system, the color management system for transforming source color image data from a source device into destination color image data for rendering by a destination device, said memory comprising:

a set of source color image data stored in the memory; and

a colorimetric data structure stored in the memory, the colorimetric data structure formatted according to an extended CGATS/IT8 format, the colorimetric data structure including a set of tags corresponding to a set of device color characteristic data elements representing a set of measured color characteristics of the source device, and including a set of tags corresponding to a set of viewing condition data elements representing a set of viewing conditions in which the device color characteristic data elements were measured.

88. An apparatus for managing color data to transform source color image data from a source device into destination color image data for rendering by a destination device, comprising:

a program memory for storing process steps executable to perform a method according to any of Claims 1 to 51; and

a processor for executing the process steps stored in said program memory.

89. Computer-executable process steps stored on a computer readable medium, said computer-executable process steps for managing color data to transform source color image data from a source device into destination color image data for rendering by a destination device, said computer-executable process steps comprising process steps executable to perform a method according to any of Claims 1 to 51.

90. A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to transform source color image data from a source device into destination color image data for rendering by a destination device, said computer-executable process steps comprising process steps executable to perform a method according to any of Claims 1 to 51.